

Appl. No. 10/696,745
Amdt. Dated September 13, 2005
Reply to Office Action of June 13, 2005

Attorney Docket No. 81716.0112
Customer No.: 26021

Amendments to the Drawings:

The attached sheets of drawings include changes to Figs. 1B, 1C, 6B, and 6C.

Attachment: Replacement Sheet
Annotated Sheet Showing Changes

REMARKS/ARGUMENTS

Minor changes are made to this specification. Claims 4, 5, 11, 12, and 15-20 are withdrawn. Claim 1 is amended. Claims 1-3, 6-10, 13 and 14 are pending in the application. Reexamination and reconsideration of the application, as amended, are respectfully requested.

DEAWING OBJECTION

The drawings are objected to over informalities. Specifically, the Office contends that the drawings do not properly identify "a thickness of the dielectric layer is approximately $(2n - 1)/4$ (n is a natural number) of a wavelength" required in claim 3 and "a distance between the internal ground conductor layer and the opening of the waveguide is approximately $(2n - 1)/4$ (n is a natural number) of a wavelength" required in claim 8 therein. In response, Applicant is submitting amended drawings including amended figures 1B, 1C, 6B, and 6C in current submission. Element " $= (2n-1)\lambda/4$ " is added on amended figures 1B and 1C for claim 3. Element " $(2n-1)\lambda/4$ " is added on amended figures 6B and 6C for claim 8. The amended drawings are believed to remedy the concerns stated in Office Action. Reconsideration and withdrawal of objection are respectfully requested.

CLAIM REJECTION UNDER 35 U.S.C. § 103(a)

Claims 1-3, 6-10, 13 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Uchimura (U.S. Patent No. 5,982,256) in view of Koriyama (U.S. Patent No. 6,239,669). Applicant respectfully traverse the rejection below.

The present invention is directed to a high frequency line-to-waveguide converter in which a high frequency line is converted into a waveguide. The connection between the high frequency circuit and an antenna or between high

frequency circuits is performed through the waveguide, such that mounting of a system can be easily performed. The amended independent claim 1 of present invention is recited below:

“A high frequency line-to-waveguide converter
comprising:

a high frequency line including a dielectric layer, a line conductor disposed on one surface of the dielectric layer, and a ground conductor layer disposed on the same surface so as to surround one end of the line conductor;

a slot formed in the ground conductor layer so as to be substantially orthogonal to the one end of the line conductor and coupled to the high frequency line;

a shield conductor part disposed on a side of or in an inside of the dielectric layer so as to surround the one end of the line conductor and the slot; and

a waveguide disposed on a side of the other surface of the dielectric layer so that an opening is opposite to the one end of the line conductor and the slot, the waveguide extending in a direction from the one surface of the dielectric layer toward the other surface thereof, and being electrically connected to the shield conductor part.”

The applied references do not disclose or suggest the above features of one aspect of the present invention as defined by amended independent claim 1. In particular, Uchimura and Koriyama not disclose or suggest, “the waveguide

extending in a direction from the one surface of the dielectric layer toward the other surface thereof,” as required by the amended independent claim 1.

Uchimura is directed to connecting the transmission line of the laminated waveguide with other transmission lines via a microstrip or coplanar line. (*Uchimura*; Col. 13, line 59 – Col. 14, line 4). According to Uchimura, a dielectric layer has upper and lower conductive layers connected by two rows of via-holes. The via-holes traverses the thickness of the dielectric layer. The rows of via-holes and the conductive layers form the boundary of the transmission line. A high frequency signal transmitted therethrough is transmitted directly from the slot hole 90 to the transmission line 5. (See, *Uchimura*; Figure 16; Col. 16, lines 27-36). The transmission lines transmits signals in the direction of the rows of the via-hole roles, intersecting or being perpendicular to the thickness direction of the dielectric. (See, *Uchimura*; Col. 4, lines 36-52; Col. 16, lines 9-19; Figure 1). Applicant notes the transmission line was cited in Office Action as the waveguide of independent claim 1. (See, *Office Action*; Page 4, last 4 lines).

In contrast, the amended independent claim 1 requires, *inter alia*, the waveguide extending in a direction from the one surface of the dielectric layer toward the other surface, or the thickness direction of the dielectric layer. Uchimura thus does not teach or disclose the above feature of amended independent claim 1.

The ancillary Koriyama reference is not seen to remedy the deficiency of Uchimura. Koriyama is directed to a microstrip transmitting signal to another microstrip via a slot in the ground layer. (See, *Koriyama*; Figures 1A, 2, 6, and 7A, Reference character 8). Koriyama also discloses a microstrip directly connecting to the sidewall of a waveguide. (See, *Koriyama*; Figures 5 and 8B). In contrast, the

claims of present invention is directed to a coplanar line on a surface of a dielectric layer.

With respect to Uchimura's coplanar line, a high frequency signal transmitted therethrough is transmitted directly from the slot hole 90 to the transmission line 5. (*See, Uchimura; Figure 16; Col. 16, lines 27-36*). Even if such constitution of Uchimura that a signal transmitted through the coplanar line is transmitted from the slot hole directly to the waveguide is combined with Koriyama's constitution, a person having ordinary skill in the art could not have arrived at the present invention in which a signal is transmitted from the slot to the waveguide via the dielectric layer.

Furthermore, Uchimura relates not only a coplanar line but also a microstrip line. However, the present invention relates to a coplanar line. Therefore, as mentioned above, the present invention differs from Koriyama and Uchimura in the arrangement of the surface ground conductor and the slot.

With the arrangement of the present invention enhances the conversion efficiency from the high frequency line to the waveguide, and the high frequency package excellent in the transmission of the high frequency signal can be provided. (*See, Specification; Page 78, lines 4-14; Page 98, lines 3-14*).

Moreover, Applicant respectfully submits that even if Koriyama was to remedy the deficiency of Uchimura, the above references cannot be properly combined to obtain the features of the present invention as recited in amended independent claim 1. Uchimura discloses waveguide in the direction intersecting or being perpendicular to the thickness direction of the dielectric layer. Alteration of the above feature of Uchimura would change the basic operating principle of Uchimura.

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Furthermore, as stated above, Koriyama is directed to microstrip connections, whereas the claims of present invention is direction to coplanar lines. Accordingly Koriyama is a non-analogous art. Thus there is no motivation to combine Koriyama with other references to obtain the features of present invention as recited in amended independent claim 1.

Since the cited references fails to disclose, teach or suggest the above features recited in amended independent claim 1, these references cannot be said to anticipate or render obvious the invention which is the subject matter of the claim. As such, withdrawal of the rejection and allowance of independent claim 1 are respectfully requested.

Dependent claims 2, 3, 6, 7-11 and 13-14 depend directly or indirectly from amended independent claim 1, and are patentable for at least the same reasons as amended independent claim 1.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (213) 337-6810 to discuss the steps necessary for placing the application in condition for allowance.

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If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,

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Date: September 13, 2005

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FIG. 1A

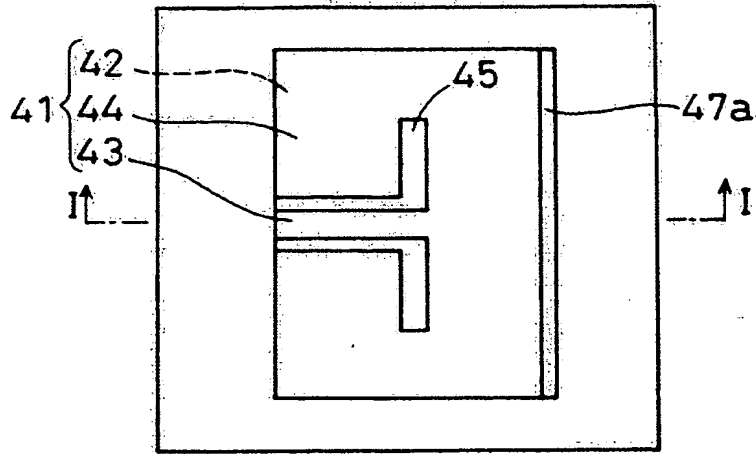


FIG. 1B

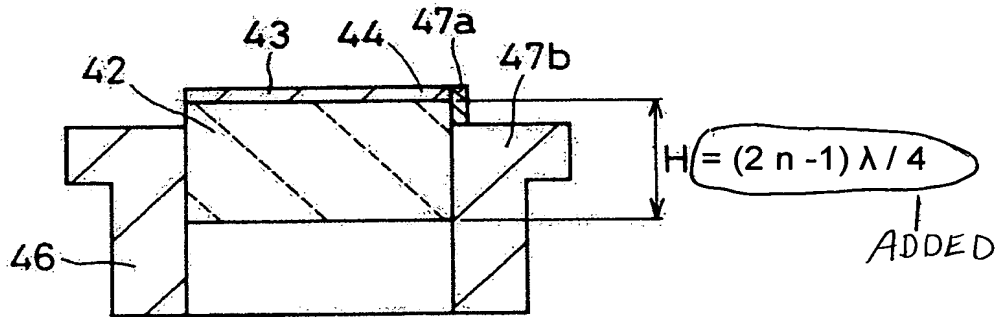


FIG. 1C

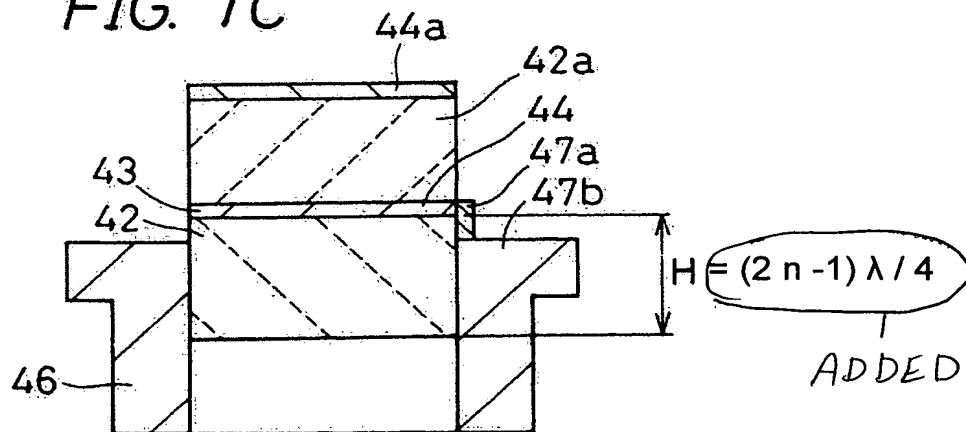


FIG. 6A

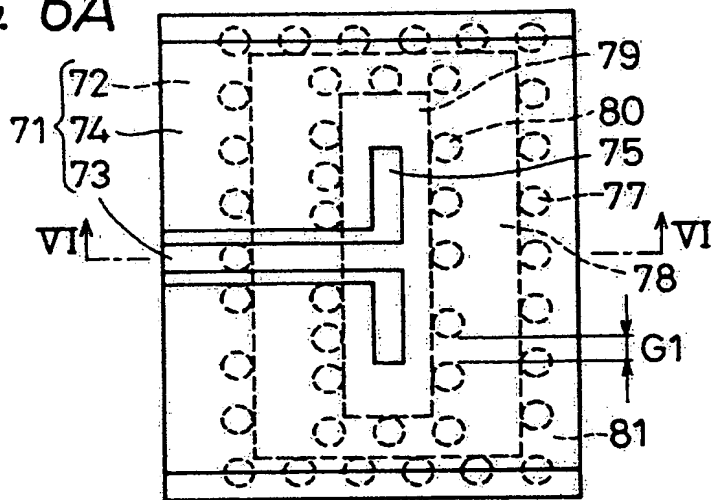


FIG. 6B

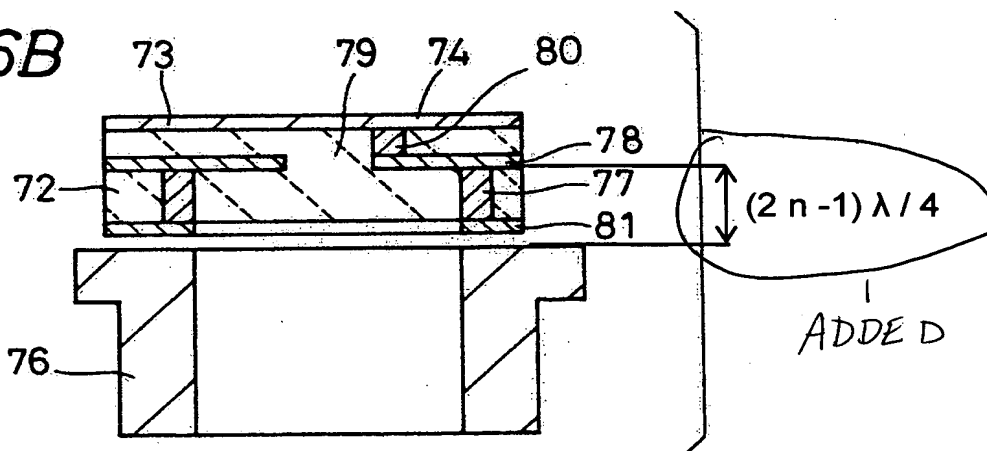


FIG. 6C

